

# *The African Organisation for Standardisation*

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ARS 847 (2012) (English): Fresh potato  
tubers -- Specification



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**Fresh potato tuber — Specification**



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## Foreword

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## Introduction

Irish potato (*Solanum tuberosum* L.) is the world's fourth largest food crop after wheat, rice and maize. Potatoes are an important source of food, employment and income in developing countries. The potato's high energy content and ease of production have also made it an important component of urban agriculture which provides jobs and food security to millions of people globally. Hundreds of millions of people in the developing countries are facing food crisis as the cost of their staple foods continues to rise.

Potatoes have the potential to relieve the pressure of increasing cereal prices on the poorest people and contribute significantly to food security. Potatoes are grown and eaten locally, with little significant international trade compared to cereals, so they are particularly valuable as food in the developing countries. Potatoes mature in 3-4 months and can yield about 40 tons/ha and hence ideally suited to places where land is limited and labour is abundant. Potatoes have a high per area production potential, can be stored relatively easily and, most importantly, can both be used as a staple food crop for household consumption and food security or sold as a cash crop. Thus, the twin role of potato provides a path out of subsistence farming and poverty with little risk exposure to farmers.

This African Standard was prepared to establish a uniform set of quality and safety requirements in order to facilitate trade in fresh potatoes.





## Fresh potato tuber — Specification

### 1 Scope

This East African standard specifies the requirements for early and ware potato tuber of varieties (cultivars) grown from (*Solanum tuberosum* L.) and its hybrids, to be supplied fresh to the consumer, and either packaged or sold loose for human consumption. It does not cover the requirements for potato tubers intended for industrial processing or seed potato tuber.

Early potatoes are obtained from early varieties and/or are harvested at the beginning of the season in the country of origin. Early potatoes means potatoes harvested before they are completely mature, marketed immediately after their harvesting, and whose skin can be easily removed without peeling.

### 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ARS 53, *General principles of food hygiene — Code of practice*

ARS 56, *Prepackaged foods — Labelling*

CAC/GL 21, *Principles for the establishment and application of microbiological criteria for foods*

CAC/RCP 44, *Recommended international code of practice for the packaging and transport of tropical fresh fruits and vegetables*

CAC/RCP 53, *Code of hygienic practice for fresh fruits and vegetables*

CODEX STAN 193, *Codex general standard for contaminants and toxins in food and feed*

ISO 874, *Fresh fruits and vegetables — Sampling*

ISO 6561, *Fruits and vegetables and derived products — Determination of cadmium content Flameless atomic absorption spectrometric method.*

ISO 6633, *Fruits and vegetables and derived products — Determination of lead content — Flameless atomic absorption spectrometric method.*

ISO 4831, *Microbiology — General guidance for the enumeration of coliforms — Most probable number technique*

ISO 4833, *Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of micro organisms — Colony — count technique at 30 °C.*

ISO 7563, *Fresh fruits and vegetable — Vocabulary*

ISO 16654, *Microbiology of food and animal feeding stuffs — Horizontal method for the detection of Escherichia coli 0157.*

### 3 Definitions

For the purposes of this standard, the terms and definitions in ISO 7563, and the following terms and definitions apply.

### 3.1

#### **black heart**

blackening of tissues in the centre of the potato tuber

### 3.2

#### **badly misshapen**

potato tuber that is seriously deformed relative to the varietal shape

### 3.3

#### **clean**

practically free from dirt or staining and practically no loose dirt or other foreign matter present in the container

### 3.4

#### **damaged**

shall mean any defect or injury which is readily apparent upon examination, or which affects the edible quality of the potato tuber

### 3.6

#### **defects**

defects which can be detected externally. However, cutting may be required to determine the extent of the injury.

### 3.7

#### **firm**

shall mean potato tuber that are not soft, flabby or shrivelled

### 3.8

#### **food grade material**

one that will not transfer non-food chemicals into the food and contains no chemicals which would be hazardous to human health

### 3.9

#### **foreign matter**

any material other than that originating from the potato tuber

### 3.10

#### **hollow heart**

cavities of various sizes in the centre of the tuber

### 3.11

#### **intact**

not having any part removed or damaged such that it makes the potato tuber incomplete

### 3.12

#### **malformed**

shape of a potato tuber not typical of the cultivar/variety concerned

### 3.13

#### **mature potato tuber**

Potato tuber with the skin of potato tuber that is generally firmly set and not feathered

### 3.14

#### **practically clean**

shall mean potato tuber that are free from dirt, stain or other foreign matter, but not from unavoidable dirt incidental to improper harvesting and packing.

**3.15****serious damage**

shall mean any injury or defect which seriously affect the appearance or the edible quality of the potato tuber

**3.16****similar varietal characteristics**

potato tuber that are of the same variety and type.

**3.17****sprout**

new shoot emerging from the tuber

**3.18****sound****wholesome**

free from disease, serious deterioration (such as but not limited to decay, breakdown, freezing damage, or soft or shrivelled specimens) or adulteration/contamination, that appreciably affects their appearance, edibility, the keeping quality of the produce or market value.

**3.19****industrial processing**

production of potato products such as starch, flour, livestock feeds, paste, granules and syrups

**4 Provisions concerning quality****4.1 General requirements**

The potato tuber shall have been carefully harvested and have reached an appropriate degree of physiological development taking into account the characteristics of the variety and the area in which they are grown.

The development and condition of the potato tuber shall be such as to enable it to

- a) withstand normal transport and handling conditions, and
- b) arrive in a satisfactory condition at the place of destination

Each package or lot must be free from waste, i.e. attached or loose earth, detached growth shoots, extraneous matter.

**4.2 Minimum requirements**

All fresh potato tubers to be supplied to the market shall meet the following minimum requirements:

- a) of normal appearance for the variety, according to the producing area;
- b) intact, i.e. they should not have had any part removed nor have suffered any damage making them incomplete;
- c) sound; produce affected by rotting or deterioration such as to make it unfit for consumption is excluded;
- d) practically clean;
- e) firm;
- f) free of abnormal external moisture; i.e. shall be adequately "dried" if they have been washed;

- g) free of any foreign smell and/or taste;
- h) free of loss of colour such as browning in the flesh;
- i) shall be covered with well-formed skin;
- j) shall be practically unsprouted, i.e. sprouts shall be no longer than 3 mm practically;
- k) free from pests affecting the general appearance of the produce;
- l) practically free from free from mechanical damage;
- m) bruise and roughness (only for varieties of which the skin is not normally rough); and
- (n) Fresh potato tuber shall be practically free of external or internal defects detrimental to the general appearance of the produce, the quality, the keeping quality and presentation in the package, such as:
  - i) brown stains due to heat;
  - ii) cracks (including growth cracks), cuts, bites, exceeding 5 mm in depth for ware potato tuber;
  - iii) green colouration; pale green flush not exceeding one eighth of the surface area and which can be removed by normal peeling does not constitute a defect;
  - iv) serious deformities(malformation, misshape,...);
  - v) grey, blue or black sub-epidermal stains; exceeding 5 mm in depth;
  - vi) rust stains, hollow or black hearts ;
  - vii) deep common potato tuber scab and powdery potato tuber scab of a depth of 2 mm or more
  - viii) superficial common potato tuber scab; i.e. scab spots in all shall not extend over more than a 25 % of the surface of the tuber;
  - ix) frost damage;

In the case of early potatoes, a partial absence of the skin shall not be considered as a defect. Ware potatoes must be covered with well-formed skin, i.e. the skin has to be fully developed and mature and cover the whole surface of the tuber.

In early potatoes, no sprouting is allowed. Ware potatoes must be practically unsprouted, i.e. sprouts may be no longer than 3 mm.

### **4.3 Classification**

**4.3.1** Fresh potato tuber may be classified before marketing. Where classification is done the following grades shall be used in accordance with the requirements of each class and the quality tolerances in Clause 6.

- a) Extra Class;
- b) Class I; and
- c) Class II.

**4.3.2 Extra Class**

Fresh potato tuber of Extra Class may be presented in any of the sizes in Clause 5.

Extra class fresh potato tuber shall be potato tuber that meets the minimum requirement in Clause 4.2. Tubers in this class shall be of superior quality. The flesh shall be perfectly sound. They shall be characteristic of the variety (for example, uniform shape and size) and free of defects (for example, sprouting, lesions, epidermal stains etc.) with exception of very slight superficial bruises not exceeding 2 % of the surface area of the tuber and provided that this will not affect the general appearance of the produce, the keeping quality and the presentation in the package.

**4.3.3 Class I**

Fresh potato tuber of Class I may be presented in any of the sizes in Clause 5.

Class I fresh potato tuber shall be potato tuber that meet the minimum requirement in Clause 4.2 and shall be of good quality

The following defects may be allowed provided the potato tubers retain their essential characteristics as regards to quality, keeping quality and presentation:

- a) defects in shape not exceeding 5% of the tubers
- b) bruising, not exceeding 10 % of the surface area of the tubers
- c) sprouts of length not more than 3 mm ;
- d) lesions not more than 2 mm in depth and not more than 3% surface coverage;
- e) sub-epidermal stains not more than 2 mm in depth,
- f) greening covering not more than 10 % of the surface of the tuber and greening intrusion not deeper than 2 mm; and the affected tubers
- g) internal defects in not more than 3 % by number or mass of the tubers;
- h) common scab not extending more than 3 % of the surface area and intrusion not exceeding 2 mm

**4.3.4 Class II**

Fresh potato tuber of Class III may be presented in any of the sizes in Clause 5. They consist of potato tuber that do not qualify for inclusion in Class II but meet the minimum requirements specified under clause 4.2.

The following defects may occur provided the fresh potato tuber retain their essential characteristics as regards to quality, keeping quality and presentation:

- a) defects in shape not exceeding 10% of the tubers
- b) bruising, not exceeding 20 % of the surface area of the tubers
- c) sprouts not more than 3 mm in length;
- d) lesions not more than 2 mm in depth and covering not more than 5% of the surface area of the tuber;
- e) greening covering not more than 10 % of the surface of the tubers and greening intrusion not deeper than 2 mm;



- f) sub-epidermal stains not more than 2 mm in depth;
- g) internal defects in not more than 5 % by number or mass of the tubers;
- h) common scab not extending more than 5 % of the surface area and intrusion not exceeding 2 mm

## 5 Provisions concerning sizing

Fresh potato tuber may be designated by size in accordance with Table 1. When the designations in Table 1 are used the sizes shall be within the specification in Table 1.

The size of the tuber shall be determined by use of an appropriate square mesh.

**Table 1 — Scale for sizing tubers**

Size	Minimum, mm	Maximum, mm
Small	31 x 31	50 x 50
Medium	51 x 51	80 x 80
Large	81 x 81	more than 81 x 81

Early and ware potatoes exceeding the maximum size shall be allowed, provided the maximum difference in size between the smallest and the largest tuber is not more than 30 mm and they are marketed under a specific denomination.

## 6 Provisions concerning tolerances

Tolerances in respect of quality and size shall be allowed in each package for produce not satisfying the requirements of the class indicated.

### 6.1 Quality tolerances

#### 6.1.1 General

Tolerances for the quality requirements shall be such that;

- a) a total of no more than 10 % of the potato tuber in the lot may fail the requirements;
- b) no more than 3 % of the potato tuber may be affected by rot, mould or deterioration as to make it unfit for consumption;
- c) no more than 3 % of the potato tuber may be affected by damage caused by pests;
- d) no more than 3 % of the potato tuber may be affected by both rot, mould or deterioration and damage caused by pests in combination; and
- e) In addition the following shall be allowed:
  - i) 1 per cent by weight of waste for early potatoes
  - ii) 2 per cent by weight of waste, of which a maximum of 1 per cent of attached earth, for ware potatoes.

#### 6.1.2 “Extra” Class

Fresh potato tuber of Extra class may have a maximum of 5 % by number or mass of potato tuber not satisfying the requirements of the class, but meeting those of Class I or exceptionally coming within the tolerances of that class.

### 6.1.2 Class I

Fresh potato tuber of Class I may have a maximum of 10 % by number or mass of potato tuber not satisfying the quality requirements of Class II, but meeting those of Class III or exceptionally coming within the tolerances of that class.

### 6.1.3 Class II

Fresh potato tubers of Class II shall satisfy the general quality requirements in Clause 4 may have a maximum of 20 %.

## 6.2 Size tolerances

Size tolerances for all classes shall be a maximum of Extra Class – 5%, Class I and II – 10% by number or the weight of potato corresponding to the size immediately above or below the size declared or indicated on the package.

## 6.3 Tolerance of other varieties

2 per cent by weight of other varieties is allowed.

# 7 Provisions concerning presentation

## 7.1 Uniformity

The contents of each package (or lot for produce presented in bulk in the transport vehicle) must be uniform and contain only early or ware potatoes of the same origin, variety, quality, colour of the skin, colour of the flesh and size (if sized).

## 7.2 Packaging

**7.2.1** Fresh potato tubers may be sold packaged or loose. Packaged potato tubers shall be packed in such a way as to protect the produce properly. The materials used inside the package must be new<sup>1</sup>, clean, and of a quality such as to avoid causing any external or internal damage to the produce and safeguard the hygienic, nutritional, and organoleptic qualities of the produce. The use of materials, particularly of paper or stamps bearing trade specifications is allowed, provided the printing or labelling has been done with non-toxic ink or glue.

**7.2.2** In the case of early potatoes, special packaging materials may be used in order to better protect the produce during long-distance transport.

**7.2.3** In order to maintain produce quality during transportation and marketing, fresh potato tubers shall be packaged and transported in accordance with the appropriate sections CAC/RCP 44.

**7.2.4** The net weight of each package of fresh potato tubers may be required to comply with the regulations of the destination country.

### 7.2.5 Description of containers

The containers shall meet the quality, hygiene, ventilation and resistance characteristics to ensure suitable handling, shipping and preserving of the fresh potato tubers. Packages must be free of all foreign matter and smell.

<sup>1</sup> For the purposes of this Standard, this includes recycled material of food-grade quality.

## 7.3 Presentation

The visible part of the contents of the package must be representative of the entire contents. A special effort should be made to suppress camouflage, i.e. concealing in the lower layers of the package produce inferior in quality and size to that displayed and marked.

Similarly prohibited is any packaging method or practice intended to give a deceptively superior appearance to the top layer of the consignment.

## 8 Marking or labelling

### 8.1 Consumer packages

In addition to the requirements of ARS 56, the following specific requirements shall apply and shall be **legibly** and **indelibly** marked:

- a) name of the produce to be shown on the label shall be "Fresh Potato Tubers";
- b) name and location address of the vendor and/or packer shall be declared;
- c) country of origin of the produce, and optionally, place of origin such as district, or region;
- d) commercial identification shall be declared by:
  - i) grade (only when classified);
  - ii) variety;
  - iii) size (size code);
  - iv) net weight (in metric system); and
  - v) Optional indications: colour of flesh (e.g., yellow or white), colour of skin, shape of tuber (round or long) and cooking type (e.g., floury or firm).
- e) lot identification (batch number);
- f) declaration of preservatives, if used;
- g) date of harvest;
- h) packing date; and
- i) storage conditions.

### 8.2 Non-retain containers

Each package must bear the following particulars, in letters grouped on the same side, legibly and indelibly marked, and visible from the outside, or in the documents accompanying the shipment.

#### 8.2.1 Identification

Name and address of exporter, packer and/or dispatcher. Identification code (optional).<sup>2</sup>

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<sup>2</sup> The national legislation of a number of countries requires the explicit declaration of the name and address. However, in the case where a code mark is used, the reference "packer and/or dispatcher (or equivalent abbreviations)" has to be indicated in close connection with the code mark.

### 8.2.2 Nature of Produce

Name of the produce if the contents are not visible from the outside. Name of the variety and/or commercial type (optional).

### 8.2.3 Origin of produce

Country of origin and, optionally, district where grown or national, regional or local place name.

### 8.2.4 Commercial Identification

- Class;
- Size (size code);
- variety
- Net weight
- Optional indications: colour of flesh (e.g., yellow or white), colour of skin, shape of tuber (round or long) and cooking type (e.g., floury or firm).

### 8.2.5 Official Inspection Mark (optional)

## 9 Contaminants

### 9.1 Pesticide residues

Fresh sweet cassava shall conform to those maximum residue limits for pesticide residues established by Codex Alimentarius Commission for this commodity.

### 9.2 Heavy metals

Fresh potato tubers shall comply with those maximum levels for heavy metal contaminants established by the Codex Alimentarius Commission for this commodity.

### 9.3 Other contaminants

Fresh potato tubers shall conform to those maximum levels of the Codex General Standard for Contaminants and Toxins in Food and Feed (CODEX STAN 193).

## 10 Hygiene

**10.1** The produce covered by the provisions of this Standard shall be prepared and handled in accordance with the appropriate sections of ARS 53 and CAC/RCP 53.

**10.2** The produce shall comply with any microbiological criteria established in accordance with the CAC/GL 21.

## 11 Sampling and test

Sampling shall be done in accordance with ISO 874. Tests for pesticide residues, contaminants and toxins shall be conducted in accordance with the recommended methods of the Codex Alimentarius Commission.

## 12 Criteria for conformity

A lot shall be declared as conforming to this standard if samples inspected or analysed for quality requirements conform to the provisions of this standard.

**Bibliography**

EAS 748:2010, *Fresh potato tuber (ware potato tuber) — Specification*

UNECE FFV 52-2006(R2011), *Potatoes, early and ware*

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